Constraint based reasoning with privacy/efficiency tradeoffs
Contains

https://www.sciencedirect.com/science/article/pii/S0004370204001535

The article explains how constraint based reasoning factors in privacy and efficiency in multi agent systems. The topic at hand is interesting because by taking away some privacy, there are less constraints and so efficiency is increased. On the contrary, if you increase privacy then efficiency is lowered. It is not true though that my increasing efficiency you are assuming to decrease privacy. So the tradeoff between efficiency and privacy is quite interesting especially when you add multiple agents who are trying to find information and search between themselves. It is definitely something that will be important in the future as AI is integrated more with industries and fields where privacy and efficiency is important.

Constraint based reasoning with privacy/efficiency tradeoffs
Contains

Nuclear:

how quantitative assessments of privacy loss can be made within the framework of distributed constraint satisfaction

Agents can make inferences about other agents' problems or subproblems from communications that carry no explicit private information using a system of "shadow CSPs" that represent various forms of possibilistic knowledge.

Sodoku CSP

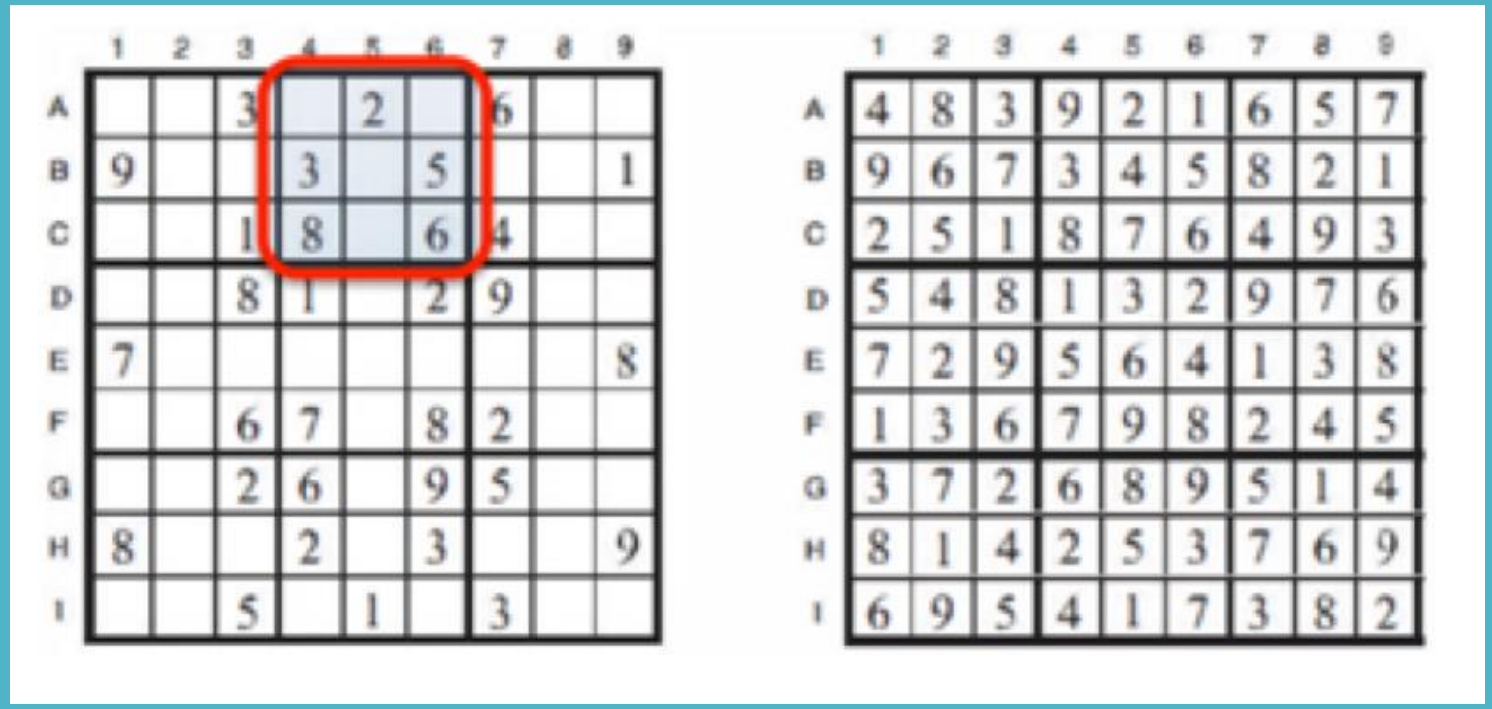
https://sandipanweb.wordpress.com/2017/03/17/solving-sudoku-as-a-constraint-satisfaction-problem-using-constraint-propagation-with-arc-consistency-checking-and-then-backtracking-with-minimum-remaning-value-heuristic-and-forward-checking/

"Solving Sudoku as a Constraint Satisfaction Problem using Constraint Propagation with Arc-Consistency Checking and then Backtracking with Minimum Remaining Value Heuristic and Forward Checking in Python"

Generating a solution to a sudoku puzzle can be seen as a solving a CSP using search. The article highlights a few of these search algorithms. We can represent the search space of a sudoku puzzle similarly to figure 4.1 of ArtInt. Nodes represent grids while arcs represent a number placement within the grid. Backtracking occurs when all arcs from a particular node lead do not satisfy the constraint indicating a return to a previous board state (node) and traveling down arcs that have yet to be taken.

Sodoku CSP

There are *81* variables in total, i.e. the tiles to be filled with digits. Each variable is named by its row and its column, and must be assigned a value from 1 to 9, subject to the constraint that no two cells in the same row, column, or box may contain the same value.



Aurora for NASA

https://www.stottlerhenke.com/products/aurora/

Aurora is an Intelligent Planning and Scheduling Solution that uses constraint-based reasoning to solve a multitude of problems. One of the applications of the Aurora software can be found at NASA's Kennedy Space Center's Space Station Processing Facility, where Aurora is used to schedule the use of floor space. This software, while originally designed for NASA, works well when used for large projects with many complex constraints. Aurora works by using its knowledge of rules and constraints while incorporating the expertise and judgment of experienced human schedulers. I think that this site is really interesting, and was unaware that such software existed. Based on the website, it seems to me that this software is superior compared to its competitors. I think it would be really interesting to learn more about how software like this one works.

Aurora for NASA

https://youtu.be/Pv_78pBYdb8

Getting Dressed/Timetable/Course Scheduling

A good real-world example of a constraint optimization problem is choosing what you're going to wear in the morning. There are several hard constraints when considering an outfit: you should have on underwear, some kind of pants, some kind of shirt, and some kind of footwear. From there, there are some soft constraints to take into consideration as well: what is the weather (maybe pants over shorts, a jacket, etc.), do you have any events (you shouldn't wear shorts and a beat-up tank top to a job interview). Technically, any combination of clothes that satisfies the hard constraints is an acceptable outfit (in that you won't get arrested for indecent exposure) but you can create more optimal solutions by meeting the soft constraints as well.